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A VEGETATION SURVEY OF BWLCH COROG, CEREDIGION, 2005

A.J.Turner, D.K.Reed & S.D.S.Bosanquet

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Cover plate: Looking westward from near the headwaters of the Afon Pemprys

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CRYNODEB

Cafodd yr arolwg hwn o Fwlch Corog ei gomisiynu gan Ymddiriedolaeth John Muir ar y cyd â'r tirfeddiannwr, er mwyn llywio'r broses o ddatblygu'r safle'n 'batrwm' o fferm weithredol ar yr ucheldir. Mae'r safle'n ymestyn ar draws 427.5 hectar o dir, ac mae'n codi o 140 metr i 388 metr mewn perthynas â'r Datwm Ordnans ar Fwlch Corog ei hun. Cerrig llaid a lleidfeini llechog Paleosöig yw'r creigiau gwaelod, ac maent wedi'u gorchuddio ag amrywiaeth o briddoedd sy'n cynnwys priddoedd brown, priddoedd bas brown, stagnopodsolau, cleiau glas stagnohwmig a phriddoedd mawn organig. Mae defaid yn pori rhan ddeheuol y safle'n ysgafn ar hyn o bryd, ac mae gwartheg wedi bod yn pori rhan ogleddol y safle'n ddiweddar.

Mae Bwlch Corog yn gorwedd rhwng dau SoDdGA: SoDdGA Pengarreg-gopa a Moel Hyrddod a SoDdGA Pencreigiau'r Llan, a hysbyswyd oherwydd eu llystyfiant gorgors a'u llystyfiant rhos sych a gwlyb. Cafodd yr arolwg ei gynnal ym mis Awst 2005 gan ddefnyddio'r Dosbarthiad Cenedlaethol Llystyfiant, a chafodd 82 o wahanol fathau o lystyfiant a chynefinoedd cysylltiedig eu cofnodi.

Gellir rhannu ardal yr arolwg yn dair prif is-ardal: caeau Pemprys, caeau Cefn Coch, ac ardal uwch Bwlch Corog sydd rhyngddynt. Gellir dweud mai llystyfiant yr ardal ganol hon yw'r llystyfiant mwyaf lled-naturiol, ac mae'r prif fathau o lystyfiant a geir yno fel a ganlyn: cors *Molinia-Potentilla* **M25**, gorgors *Scirpus-Eriophorum* **M17**, rhos wlyb *Scirpus-Erica* **M15**, rhos *Calluna-Vaccinium* **H12**, cors *Carex-Sphagnum* **M6**, glaswelltir *Festuca-Agrostis-Galium* **U4**, glaswelltir *Nardus-Galium* **U5**, a glaswelltir *Juncus-Festuca* **U6**. Ceir ardaloedd helaeth o lystyfiant lle nad oes llawer o rywogaethau a lle mae *Molinia* yn fwy amlwg nag unrhyw beth arall. Awgryma hynny bod llawer o losgi a phori wedi digwydd yno yn y gorffennol a bod hynny fwy na thebyg wedi dod i ben pan blannwyd y goedwig sydd gerllaw.

Mae'r llystyfiant a geir ym Mhemprys yn cynnwys cymysgedd o lystyfiant a addaswyd a llystyfiant eithaf lled-naturiol. Mae'r llystyfiant a addaswyd yn cynnwys ardal fawr o borfa frwynog *Holcus-Juncus* **MG10** a chlwstwr mawr o gymuned *Pteridium-Galium* **U20**. Mae'r llystyfiant a addaswyd i raddau llai yno'n cynnwys **M25**, rhos *Calluna-Ulex* **H8**, rhos *Vaccinium-Deschampsia* **H18** a chymuned o lysiau tal *Luzula-Vaccinium* **U16**. Mae ardaloedd bach o orgors **M17** yn bresennol yno hefyd.

Mae gan fferm ogleddol Cefn Coch ardaloedd sylweddol o lystyfiant afreolaidd wedi'i wella lle mae rhedyn yn fwy amlwg nag unrhyw beth arall (glaswelltir *Lolium-Cynosurus* **MG6**, **U20**, cymuned *Urtica-Galium* **OV24** a chymuned *Urtica-Cirsium* **OV25**) ynghyd â chymunedau mwy lled-naturiol, megis **M25**, **M17**, **M15**, porfa frwynog *Juncus-Galium* **M23** a rhos *Ulex-Agrostis* **H4** ar rannau uchaf y fferm. Mae ardaloedd o goetir *Quercus-Betula-Oxalis* **W11** ar wasgar ar hyd Nant Cefn Coch.

Trafodir y posibilrwydd o adfer y llystyfiant i gyflwr mwy lled-naturiol. Cynigir y dylid adfer y llystyfiant yn rhan ganol y safle er mwyn ei alluogi i gysylltu â llystyfiant tebyg yn y ddau SoDdGA cyfagos. Gellir gwella cyflwr y cymunedau gorgors, rhos wlyb a rhos sych yn y rhan ganol trwy adael i wartheg bori'r tir yn drwm i ddechrau er mwyn atal *Molinia caerulea* rhag bod yn drech na phopeth arall, ac yna gwasgaru malurion grug er mwyn darparu ffynhonnell gychwynnol o hadau. Yn achos yr ardaloedd o lystyfiant sydd wedi'i wella i raddau mwy helaeth, lle mae rhedyn yn fwy amlwg nag unrhyw beth arall, awgrymir y byddai troi'r llystyfiant yn rhannol neu'n gyfan gwbl yn rhyw fath o goetir collddail yn ddull priodol o adfer bioamrywiaeth (yn amodol ar gyfyngiadau economaidd).

Caiff mapiau llystyfiant dan gynlluniau dosbarthu cynefinoedd Cam 1 ac Atodiad 1 eu cyflwyno.

SUMMARY

This survey of Bwlch Corog was commissioned by the John Muir Trust in conjunction with the landowner to inform the development of the site as an 'exemplar' working upland farm. The site covers 427.5 ha and rises from 140m to 388m OD on Bwlch Corog itself. The underlying rocks are Palaeozoic slaty mudstones and siltstones which have draped over them a variety of soils including brown earths, brown rankers, stagnopodzols, stagnohumic gleys and organic peat soils. The southern part of the site is currently grazed by sheep at a low grazing pressure, while the northern part of the site has been recently cattle grazed.

Bwlch Corog is located between two SSSIs: Pengarreg-gopa a Moel Hyrddod SSSI and Pencreigiau'r Llan SSSI which are notified for their blanket mire, dry and wet heath vegetation. The survey was undertaken in August 2005, using the National Vegetation Classification and 82 vegetation types and related habitats were recorded.

The survey area can be divided into three main sub-areas: the enclosed fields of Pemprys and Cefn Coch separated by the more upland area of Bwlch Corog. The vegetation of this central area can be regarded as the most semi-natural and the principal vegetation types are **M25** *Molinia-Potentilla* mire, **M17** *Scirpus-Eriophorum* blanket mire, **M15** *Scirpus-Erica* wet heath, **H12** *Calluna-Vaccinium* heath, **M6** *Carex-Sphagnum* mire **U4** *Festuca-Agrostis-Galium* grassland, **U5** *Nardus-Galium* grassland and **U6** *Juncus-Festuca* grassland. There are large expanses of species-poor *Molinia*-dominated vegetation pointing to a prior history of frequent burning and heavy grazing which probably ceased when the adjacent forestry was planted.

The vegetation of Pemprys consists of a mixture of modified and relatively semi-natural vegetation. The former includes a large area of **MG10** *Holcus-Juncus* rush-pasture together and a large stand of **U20** *Pteridium-Galium* community. The less modified vegetation here includes **M25**, **H8** *Calluna-Ulex* heath, **H18** *Vaccinium-Deschampsia* heath and **U16** *Luzula-Vaccinium* tall-herb community. Small areas of **M17** blanket mire are also present.

The northern holding of Cefn Coch has significant areas of improved, bracken-dominated and disturbed vegetation (**MG6** *Lolium-Cynosurus* grassland, **U20**, **OV24** *Urtica-Galium community* and **OV25** *Urtica-Cirsium community*), together with more semi-natural

communities, such as **M25**, **M17**, **M15**, **M23** *Juncus-Galium* rush-pasture and **H4** *Ulex-Agrostis* heath on the higher parts of the holding. There are areas of **W11** *Quercus-Betula-Oxalis* woodland distributed along the Nant Cefn Coch.

The potential for restoring the vegetation to a more semi-natural state is discussed. It is proposed that the vegetation of central part of the site be restored to allow it to connect with similar vegetation in the two adjacent SSSIs. The condition of blanket mire, wet and dry heath communities of the central area can be improved by an initial period of heavy cattle grazing to break down the dominance of *Molinia caerulea*, followed by the spreading of ericoid brashings to provide an initial seed source. For the areas of more improved and bracken-dominated vegetation, it is suggested that, subject to economic constraints, a partial or complete conversion to some form of broad-leaved woodland would be an appropriate method of restoring biodiversity.

Maps of the vegetation under the Phase 1 and Annex 1 habitat classification schemes are presented.

1. INTRODUCTION

This survey was commissioned by the John Muir Trust (JMT) who entered into a partnership with the landowner, Adam Besterman, in 2004 to work with him in trying to maximise the environmental benefit for the site. The JMT is "committed to practicing the highest quality environmental land management to maintain and/or enhance our wild lands, and to give them new life. The Cambrian Uplands, which fall short of the top criteria for wild land categorisation, through Bwlch Corog offer a major opportunity for restoring the natural beauty and working towards re-wilding as a longer term vision coupled with the socio-economic benefits of doing so" (JMT website). The JMT with the landowner propose to develop an 'exemplar' working upland farm in the Cambrian Uplands. The purpose of this detailed survey using the National Vegetation Classification (NVC) (Rodwell *et al.* 1991 *et seq.*) is to inform that development.

1.1 The survey area

The survey area is a small area of upland covering 427.45 ha and is situated 18.5 km northeast of Aberystwyth, 4 km south of Machynlleth and 3 km ESE of the small village of Furnace (Figure A3.1 in Appendix 3). It is a crescent shaped piece of land c4.4km in length aligned SW-NE and varies between 600m and 1.4km wide. It rises to 388m OD in the centre of the site at Bwlch Corog, to 360m OD on Foel Einion on the southern edge and to 299m OD on the Cefn Coch plateau in the north. It contains two valleys (Nant Cefn Coch and Afon Pemprys) separated by the intervening high ground of Bwlch Corog. Nant Cefn Coch is a V-shaped valley and drains the northern part of the site in a north-north-westerly direction reaching the Llyfnant Valley about 1km north of the northern boundary at Glaspwll. The lowest point on the site is where the Nant Cefn Coch crosses the northern boundary at 140m OD. The Afon Pemprys, in contrast, lies in a slightly over steepened valley which drains the southern part of the site in a westerly direction and flows into the Afon Einion in Cwm Einion about 500m beyond the western extremity of the site at Ystrad Einion. The central Bwlch Corog section is drained by both these systems and also by the Nant y Castell that flows north into the Nant Cefn Coch.

The site is located at the north-western extremity of the central Welsh upland plateau and is sandwiched between two upland Sites of Special Scientific Interest (SSSI), Pencarreg-gopa a Moel Hyrddod SSSI to the west and Pencreigiau'r Llan SSSI to the east (Figure

A3.2 in Appendix 3). Pencreigiau'r Llan SSSI is immediately adjacent to Bwlch Corog, while Pengarreg-gopa a Moel Hyrddod SSSI is separated by a strip of land c200m in width. Both these SSSIs are notified for their blanket bog and dry heath, with Pencreigiau'r Llan being notified additionally for wet heath.

For descriptive purposes, the site can be split into 10 areas, labelled A-J in Figure 1.1; these are mainly composed of management units or groups of units.

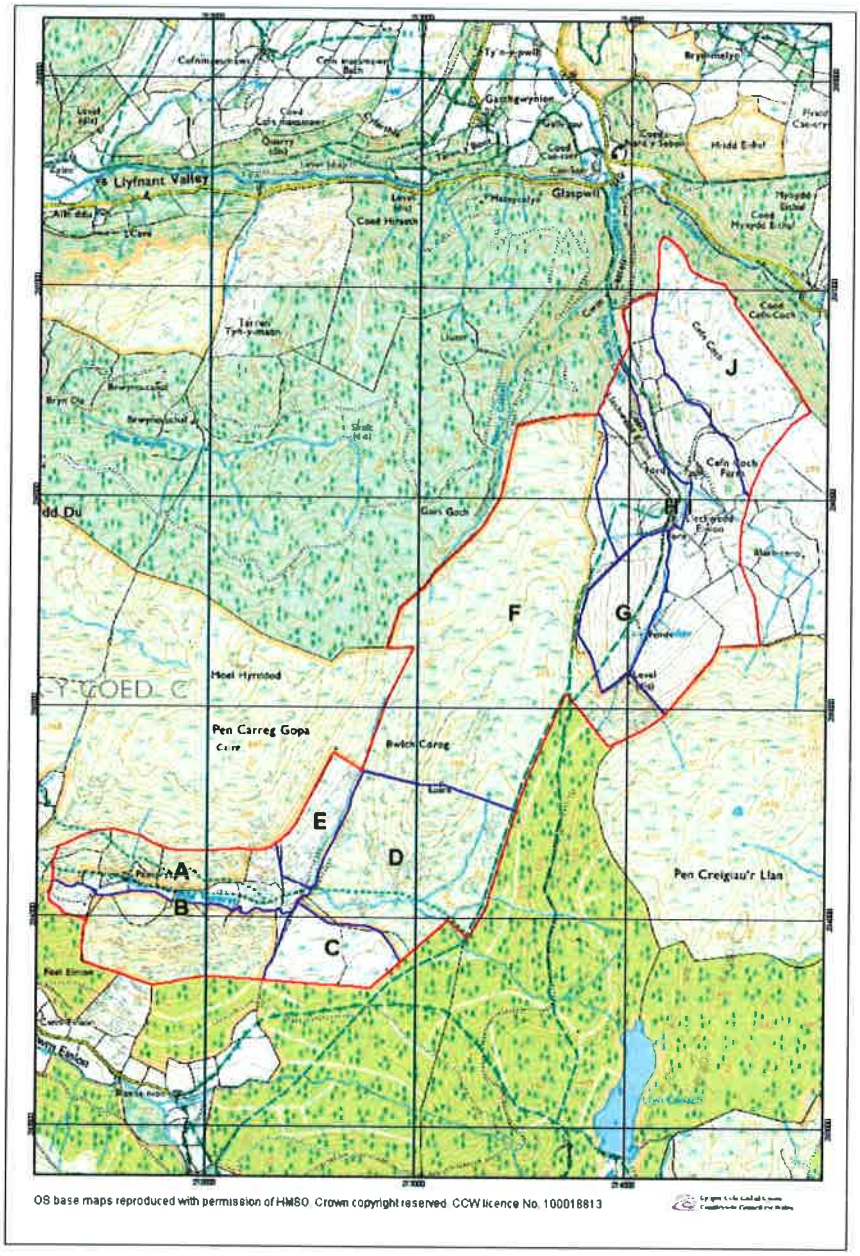

Figure 1.1 Bwlch Corog – descriptive areas

1.2 Geology and soils

The site is underlain by generally hard and impermeable rocks of Palaeozoic age. The rock types present are slaty mudstones and siltstones. The majority are of Ordovician age from the Ashgill series with a minor contribution from rock of the Caradoc series which outcrop in the Pemprys farm section. Younger rocks of similar lithology from the Llandovery series of the Silurian occur beneath the eastern area of the Pemprys section and the south-eastern Cefn Coch section.

The site has been subject to several episodes of glaciation through the Late Pleistocene, but geomorphological evidence of this is restricted solely to the slightly over steepened northern slope of Foel Einion above the Afon Pemprys.

Soil survey information for the site is taken from Rudeforth (1970); the soil series in this have been translated into the current nomenclature using Clayden and Hollis (1984). There are a variety of soils present on the site, the most prominent of which are the ironpan stagnopodsols of the Hiraethog series, which occur in compartments C, D, F and the upper parts of B. They are also found the lower part of compartment D in a complex with Wilcocks soils (cambic stagnohumic gleys) and organic peat soils of the Crowdy series. A complex of brown earths (Denbigh series) and brown rankers (Powys series) are draped over the north facing slope of compartment B and a section of the upper part of Cefn Coch (compartment J). The south-facing slopes of A in the Pemprys holding together with the steeper slopes in compartments G, H, I and J in Nant Cefn Coch support a mor phase of the brown earths of the Denbigh series. Organic peat soils occur along the western base of the hill of Bwlch Corog as well as along a mid-slope break of slope on the east side. The soils along the course of the Afon Pemprys and the Nant Cefn Coch are mapped as undifferentiated valley soils and include a range of alluvial soils interspersed with soils form the adjacent slopes.

The Denbigh and Powys series are generally free draining. On the higher, less steeply sloping parts of the site, the drainage is less free and the soils have wetness classes of IV-VI (Hodgson 1976) which imply varying degrees of soil waterlogging from seasonal waterlogging at 70cm depth for wetness class IV to almost permanent waterlogging at 40cm for wetness class VI.

1.3 Climate

The survey area is situated close to the west coast and as such is subject to a moist airstream with frequent episodes of cyclonic weather. The average annual rainfall on the site derived from 1km square data varies between 1734mm and 1905mm (Meteorological Office (1991a). Average temperatures from 5km grid data (SN79NW and SN79NE) are 3.2-3.8 °C for January and 13.5 – 14.2 °C for July. (Meteorological Office (1991b)).

According to the Climatic Classification of England and Wales (Bendelow and Hartnup 1980), the site falls into the B2p bioclimatic subregion. This comprises exposed, slightly cold and slightly wet regions with a moisture deficit range of 45 – 65mm annually and the annual accumulated temperature above 5.6 °C is in the range 825-1375 day-degrees. The number of rain days (days with rainfall ≥ 1 mm) is in the range 180-220 days (from Hill *et al.* 1991) while the median field capacity period for soils is in the region of 250 days (Rudeforth *et al.* 1984).

1.4 Previous vegetation surveys

The site has not been subject to a previous survey using the National Vegetation Classification. The majority of the site was surveyed by the Nature Conservancy Council's Wales Field Unit (WFU) as part of the Upland Vegetation Survey of the Pumlumon area in September 1980 (Burn 1981) using the Ratcliffe-Birks classification (1980). A vegetation map of the area is shown in Appendix 3.4

The remaining section of the site, which includes Cefn Coch and the higher ground to the north was mapped as part of the Phase 1 survey of Ceredigion between 1993 and 1997.

1.5 Land ownership and access arrangements

The survey area comprises the two holding of Pemprys (areas A-E) and Cefn Coch (areas F-J), both of which are owned by Adam Besterman. JMT are in partnership with him to maximise environmental benefit on the site. John Muir Trust is based at 41 Commercial Street, Edinburgh, EH6 6JD. Access arrangements to survey the site were made by Karen Heppingstall, CCW's Senior Conservation Officer for North Ceredigion through Dave Picken, Education Manager for the JMT.

2. SURVEY METHODS

2.1 Methodology

The survey was undertaken by D.K. Reed and A.J. Turner of CCW's Phase II survey team between the 1st and 4th of August 2005. Homogeneous stands of heath, mire, grassland and associated vegetation were identified, sampled and mapped, using the National Vegetation Classification (NVC) (Rodwell *et al.*, 1991 *et seq.*) as the basis for community definition. Additional forms of vegetation were recognised when floristic composition differed from the descriptions given in the NVC. Field survey work, including mapping and sampling, took 6 person days.

Areas of vegetation were mapped onto preprinted orthorectified aerial photos (Getmapping, 2001) at a scale of 1:10,000 which had had a 100m grid overprinted on them to facilitate accurate location using Geographical Positioning Systems (GPS). Vegetation boundaries were drawn as accurately as possible, except for fine-scale associations of different stand types, which were mapped as mosaics with the percentage cover of each vegetation type noted. Field vegetation maps were scanned and registered, and polygon boundaries were digitized by CCW staff using MapInfo 8.0.

Vegetation was sampled very selectively using 2 x 2 m quadrats, within which the abundance of each species of vascular plant, bryophyte and macro-lichen was estimated using the Domin scale (Dahl and Hadac 1941). Associated variables, such as cover of bare ground, bare rock and litter, were noted as well as total cover of dwarf-shrubs, grass, *Sphagna*, bryophytes (excluding *Sphagna*) and macro-lichens. Dwarf-shrub and field layer heights were also noted. Quadrat locations were recorded on field maps and also marked using hand-held Garmin III GPS receivers. Notes on vegetation composition, structure and management were made at each quadrat sampling point and elsewhere where noteworthy features were observed.

Due to shortage of time, quadrats were only recorded in the more extensive and ecologically more interesting vegetation types. Accurate identification of plants encountered during floristic recording was considered to be important, and particular care was taken to distinguish between closely allied species with distinct ecological preferences. Bryophytes and lichens of uncertain determination in the field were sampled

and subjected to later microscopic identification. Critical determinations were made by S.D.S. Bosanquet.

2.2 Nomenclature

Nomenclature generally follows Stace (1997) for vascular plants, Hill *et al.* (2006) for bryophytes and Coppins (2003) for macrolichens. For NVC communities, the nomenclature of the published volumes of the NVC (Rodwell *et al.*, 1991 *et seq.*) is adhered to.

Quadrats were recorded using the DOMIN scale (Dahl and Hadac 1941):

Domin value	**Cover/abundance**
1	< 4%, with few individuals
2	< 4%, with several individuals
3	< 4%, with many individuals
4	4% - 10%
5	11% - 25%
6	26% - 33%
7	34% - 50%
8	51% - 75%
9	76% - 90%
10	91% - 100%

Occasional stands of vegetation were recorded using the DACFOR scale, a combination of the DAFOR and ACFOR scales (Kent and Coker 1992) which for the purposes of this survey is defined as follows:

D	Dominant	In >60% of all potential quadrats, mean cover >= 50%
A	Abundant	In >60% of all potential quadrats, mean cover between 20% and 50%
C	Common	In 60% of all potential quadrats, mean cover <20%
F	Frequent	In between 40% and 60% of all quadrats
O	Occasional	In between 20% and 40% of all quadrats
R	Rare	In fewer than 20% of all quadrats
L	Locally	

3. DESCRIPTION OF VEGETATION TYPES

3.1 NVC communities

NVC communities are described below under their NVC community headings which are grouped into 8 sections of main upland habitat types.

82 categories of vegetation were recorded at the level of the NVC classification. These comprise 56 NVC communities or sub-communities, 3 intermediates between sub-communities, 7 variants of communities/sub-communities, 10 non-NVC categories of vegetation commonly recognized elsewhere in upland Wales, and 6 categories of unvegetated land.

The areas of the communities mapped are given in Table 3.1 at the end of this section. Two NVC maps of Bwlch Corog at 1:10,000 scale are shown in Appendix A3.2 together with a colour key and a list of codes used.

3.1.1 Heaths

H4 *Ulex gallii - Agrostis curtisii* heath

Small areas of this essentially lowland type of *Ulex gallii*-dominated heath were mapped on the upper parts of compartment J and in Pemprys on the slopes of A. The vegetation differs from the more abundant **H8** *Calluna-Ulex* heath in having constant *Molinia caerulea*, even though it is slightly atypical in an NVC context as it lacks *Agrostis curtisii* being outside the geographical range of this species. As well as dominant *Ulex* the dwarf-shrub cover is provided by frequent *Calluna vulgaris* and occasional to locally frequent *Erica cinerea*. The stands are very species-poor with only *Pteridium aquilinum* as the other main component. The *Pteridium* overtops the *Ulex gallii* in some stands while others contain additional *Potentilla erecta* and *Deschampsia flexuosa*. **H4** vegetation similar to this lacking *A. curtisii* has been recorded from lowland heathlands in Pembrokeshire, Anglesey and Gwynedd (CCW unpublished data).

H8 *Calluna vulgaris - Ulex gallii* heath

The majority of the *Ulex gallii*-dominated dry heath present on the site was referred to this vegetation community. Three sub-communities and one variant were noted, the

predominant type being the grassy *Danthonia decumbens* sub-community **H8b** where large bushes of *U. gallii* are set in a matrix of acid grassland containing *Danthonia*, *Festuca ovina*, *Agrostis capillaris* and *Potentilla erecta*. This form occurs solely on the Bwlch Corog section, as a fringe to the stream in the south-west corner where it abuts the Pemprys section (compartment E) and also in the far south of compartment D, where it forms part of a mosaic with wet heath and marshy grassland.

Much of the remaining **H8** is the Species-poor sub-community **H8a**, which has a dense canopy of *U. gallii* mixed with scattered plants of *C. vulgaris* and *Erica cinerea*, and where other species are very rare. This was mapped on the western side of Bwlch Corog and contains additional *Festuca ovina* and *Potentilla erecta*.

H8e, the *Vaccinium myrtillus* sub-community, was mapped on two small cliff sections above streams, the first in the eastern part of compartment D and the second in the eastern part of compartment F. The apparently ungrazed vegetation in compartment D (Q15) is relatively species-rich with abundant *Calluna vulgaris*, *Erica cinerea*, *Vaccinium myrtillus* and *Ulex gallii* over an understorey containing the ferns *Blechnum spicant*, *Oreopteris limbosperma* and *Dryopteris dilatata* and the herbs *Galium saxatile*, *Digitalis purpurea* and *Sedum anglicum*. The bryophyte components include the mosses *Hypnum jutlandicum* and *Racomitrium heterostichum*, and the liverworts *Diplophyllum albicans*, *Lophozia excisa* and *L. sudetica*. The most frequent lichen is *Hypogymnia physodes*. The vegetation in compartment F, by contrast, is relatively species-poor with the field layer only containing *Potentilla erecta*, *Digitalis purpurea* and *Oreopteris limbosperma*.

A species-poor *Ulex gallii*-dominated form of **H8** which is not assigned to sub-community level is found mainly in compartments E and J with a small stand in compartment I. This vegetation has frequent to abundant *Ulex gallii* but with little or no *Calluna* or *Erica cinerea*. The field layer is identical with **U4** *Festuca-Agrostis-Galium* grassland or **U5** *Nardus-Galium* grassland with frequent *Festuca ovina*, *Agrostis capillaris*, *Nardus stricta*, *Potentilla erecta*, *Galium saxatile* and in the bryophyte layer hypnoid mosses and acrocarpous species such as *Dicranum scoparium*.

Plate 3.1 H8e on small cliff above a stream in compartment F.

H10 *Calluna vulgaris - Erica cinerea* heath

A small proportion of the mapped *Calluna vulgaris*-dominated dry heath lacking *Ulex gallii* is referable to **H10** and in particular to the *Racomitrium lanuginosum* sub-community **H10b**. This vegetation was recorded in the far north of the Cefn Coch section on several small outcrops in association with **U1** *Festuca-Agrostis-Rumex* grassland, **M15b** *Scirpus-Erica* wet heath, **M25 species-poor** *Molinia-Potentilla* mire and **U20a** *Pteridium-Galium* community. The heath has abundant *C. vulgaris* and *Pleurozium schreberi* with frequent *Carex binervis*, *Deschampsia flexuosa*, *Potentilla erecta*, *Cladonia portentosa*, *Festuca ovina*, *Cladonia furcata*, *Galium saxatile* and occasional *Dicranum scoparium* and *Molinia caerulea*.

H12 *Calluna vulgaris - Vaccinium myrtillus* heath

This is the more widespread form of *Calluna*-dominated heath lacking *Ulex gallii*. It occurs solely on the eastern side of the saddle on Bwlch Corog within a complex mosaic of wet heath and marshy grassland, the **H12** marking out the steeper freely draining slopes. It was also recorded in small patches on the north-facing slopes of the Pemprys

section. All is of the *Calluna vulgaris* sub-community **H12a**. This vegetation has dominant *Calluna* with frequent *Vaccinium myrtillus* over species-poor ground and field layers comprising *Deschampsia* flexuosa, the hypnoid mosses *Hypnum jutlandicum* and *Rhytidiadelphus loreus* and the lichen *Cladonia portentosa*.

H18 *Vaccinium myrtillus - Deschampsia flexuosa* heath

Vaccinium myrtillus-dominated heath can all be referred to **H18**, and two sub-communities and a variant were mapped. Stands of the *Hylocomium splendens - Rhytidiadelphus loreus* sub-community **H18a** have frequent *Calluna vulgaris* and *Deschampsia flexuosa* with the field layer dominated by *Pleurozium schreberi* and *Rhytidiadelphus loreus*. This sub-community is found only in compartment B on the north-facing slopes of Foel Einion.

A variant of this, not covered by the NVC, **H18a *Sphagnum capillifolium*** variant (Q11), was mapped as on the steep north-facing slopes of Pemprys. This vegetation is marked by much more frequent *Sphagnum capillifolium* together with *S. subnitens, S. quinquefarium, Plagiothecium undulatum* and *Polytrichum commune*. Other species encountered included occasional *Molinia caerulea* and frequent *Luzula sylvatica*. The vegetation occurs in extensive mosaics with **U16c** *Luzula-Vaccinium* tall-herb community, **H18a** and a *Vaccinium myrtillus* variant of **M25a** *Molinia-Potentilla* mire. This form of vegetation has been recorded on many of the upland areas in North Wales and its distribution extends down to Elenydd (Averis and Averis 1999, Averis *et al.* 2004). It is generally thought to be derived from **H21** *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath by heavy grazing.

There is also a single small stand of the *Alchemilla alpina - Carex pilulifera* sub-community **H18b** on the same north-facing slope at Pemprys. This is a much grassier form of *Vaccinium*-heath with a more open dwarf-shrub canopy. It has frequent *Anthoxanthum odoratum, Deschampsia flexuosa, Festuca ovina* and *Luzula sylvatica* and has a lower bryophyte cover than the **H18a**.

M15 *Scirpus cespitosus - Erica tetralix* wet heath

All the wet heath at Bwlch Corog is **M15**. It forms a subordinate component of mosaics with **M17** *Scirpus-Eriophorum* blanket mire and **M25** *Molinia-Potentilla* mire on Bwlch

Corog and Cefn Coch, with occasional stands at Pemprys. This vegetation is distinguished through its combinations of *Calluna vulgaris*, *Erica tetralix*, *Molinia caerulea* and usually *Trichophorum cespitosum*, though one or more of the species can be absent. The vast majority of the **M15** mapped at Bwlch Corog is in moderate condition, with the *M. caerulea* neither dominant nor tussocky; but there is a lack of *Sphagnum* in quite a lot of the wet heath and a high frequency of *Juncus squarrosus* which disallows assignment to good condition.

Most of the **M15** has a dry and grassy appearance, characterised by frequent *Nardus stricta*, *Deschampsia flexuosa*, *Juncus squarrosus* and *Vaccinium myrtillus* allowing referral to the *Vaccinium myrtillus* sub-community **M15d**. This vegetation contains mosses such as *Dicranum scoparium*, *Pleurozium schreberi*, *Polytrichum commune* and *Hypnum jutlandicum* rather than *Sphagnum* species. The majority of the stands on the Bwlch Corog section are well-characterised and appear to be of reasonable quality. Some stands such as those on Cefn Coch (compartment J) appear even drier, harbouring a low cover of both *Cladonia portentosa* and *Leucobryum glaucum* indicating a transition towards **M15c**.

A single small stand of the *Cladonia* species sub-community **M15c** was mapped on one of the higher parts of Cefn Coch (compartment J) and as well as the community constants was characterized by the presence of frequent *Erica cinerea* and occasional to locally dominant *Cladonia portentosa*. *Leucobryum glaucum*, *Sphagnum subnitens*, *Dactylorhiza maculata*, *Carex panicea* and *Pleurozium schreberi* are all occasional in this vegetation. This dry form of **M15** was found in association with **M15b**, **H4** *Ulex-Agrostis* heath, **M17a** *Scirpus-Eriophorum* blanket mire and species-poor **M25** *Molinia-Potentilla* mire.

The Typical sub-community **M15b** is less common on the site, and occurs on wetter peats. It is marked by patches of *Sphagnum capillifolium*, *S. denticulatum*, and preferentially here *S. papillosum* with *Vaccinium myrtillus* and *Juncus squarrosus* absent. It is found mainly in compartments D, F and J with minor occurrences in A, E, G and I.

Intermediate **M15** containing preferentials for both **M15b** and **M15d**, was referred to as **M15b/d** (Q01), and occurs in the north-western corner of compartment F abutting the forestry. This area of **M15b/d** is marked by abundant *Trichophorum cespitosum* and contains species characteristic of both drier situations, such as *Vaccinium myrtillus*,

Nardus stricta and *Hypnum jutlandicum* and wetter ones, including *Sphagnum papillosum*, *S. subnitens*, *S. capillifolium* and *S. tenellum*.

A very small flush of the *Carex panicea* sub-community **M15a** was mapped at the base of the north-facing slopes of compartment B. This has fairly open vegetation with abundant *Campylopus atrovirens*, frequent *Erica tetralix*, *Drosera rotundifolia*, *Narthecium ossifragum*, *Molinia* and occasional to locally frequent *Trichophorum cespitosum*. Other species noted include *Racomitrium lanuginosum*, *Sphagnum denticulatum* and *Calluna vulgaris*.

M15 unassigned to any sub-community was recorded in a single small stand on the western edge of Bwlch Corog (compartment F). This is a scruffy piece of species-poor wet heath, characterised by abundant *Molinia caerulea*, *Erica tetralix* and *Trichophorum cespitosum* with no sub-community preferentials.

3.1.2 Mire and flush vegetation

M2 *Sphagnum cuspidatum/recurvum* bog-pool community

Small patches of the *Rhynchospora alba* sub-community **M2b** occur in runnels within blanket mire, grading into **M21b** *Narthecium-Sphagnum* valley-mire as discussed below. Here *Narthecium* and *Erica tetralix* reduce in frequency relative to the surrounding **M21** and the *Sphagnum* layer is dominated by mixtures of *S. cuspidatum* and *S. fallax*. Other small stands elsewhere on the top of Bwlch Corog hold little more than *Eriophorum angustifolium* over a continuous *Sphagnum* carpet of *S. fallax*, *S. cuspidatum* and *S. papillosum*.

M6 *Carex echinata - Sphagnum recurvum/auriculatum* mire

This soligenous vegetation occurs widely on Bwlch Corog itself (compartments D and F), but is of limited extent in the other compartments in Pemprys and Cefn Coch. All four sub-communities are recorded, each defined by the rush or sedge species that predominates in the sward.

The rush-dominated forms of **M6** are the most widely recorded. Most prevalent is **M6c** (*Juncus effusus* sub-community) which was most frequently encountered in compartments

D and F on Bwlch Corog, marks the courses of springs, streams and areas of flushing on the side slopes. There are also scattered stands along the Afon Pemprys and a small concentration on the southern upland slopes of Cefn Coch, abutting the forestry and Bwlch Corog. A southwards running runnel on the southern slope of Bwlch Corog is typical of the sub-community – species-poor vegetation harbouring abundant *Juncus effusus* with low cover associates of *Agrostis canina* and *Viola palustris* over a carpet of *Sphagnum fallax*. Some stands contain sporadic clumps of *Deschampsia cespitosa,* while others are slightly more species-rich and contain occasional poor-fen forbs, such as *Galium palustre* and *Lotus pedunculatus*.

M6d, the *Juncus acutiflorus* sub-community, is very similar vegetation to **M6c**, differing only in the dominant. This is a much more restricted vegetation type: there is a single stand on the saddle of Cefn Coch, a big runnel at the southern end of Bwlch Corog and small patches along the Afon Pemprys.

Sedge-dominated **M6** was far less often encountered than the rush-dominated forms. **M6a**, the *Carex echinata* sub-community, was mapped only on the Pemprys section abutting the Afon Pemprys. Here, frequent *Eriophorum angustifolium, Carex echinata, Agrostis canina, Festuca ovina, Potentilla erecta* and *Molinia caerulea* occur over *Sphagnum fallax, Sphagnum subnitens, Sphagnum denticulatum* and occasional *Sphagnum papillosum.*

M6b, *Carex nigra - Nardus stricta* sub-community, differs from the other sub-communities in its grassier appearance. It holds frequent *Nardus stricta, Molinia caerulea, Carex binervis, Potentilla erecta, Anthoxanthum odoratum* and *Agrostis capillaris* over a carpet dominated by *Sphagnum palustre, Sphagnum subnitens, Polytrichum commune* and occasional *Sphagnum capillifolium.* This was only recorded along the eastern edge of compartment F where it abuts Pencreigiau'r Llan SSSI.

M17 *Scirpus cespitosus - Eriophorum vaginatum* blanket mire

M17 is found on flat areas on the higher parts of all three sections of the site, but predominantly on the saddle section of Bwlch Corog (compartment F). Combinations of frequent *Molinia caerulea, Calluna vulgaris, Erica tetralix* and, preferentially, *Eriophorum vaginatum* over a carpet of *Sphagna*, or in drier conditions additional

hypnoid mosses, mark the community. *Trichophorum cespitosum* is generally frequent throughout, though can be lacking in some stands. Two sub-communities were mapped.

M17c, the *Juncus squarrosus* - *Rhytidiadelphus loreus* sub-community (Q02, Q03 and Q13), has additional green bushes of *Vaccinium myrtillus*, pale tufts of *Nardus stricta* and tussocks of *Deschampsia flexuosa.* Wefts of pleurocarpous mosses such as *Rhytidiadelphus loreus*, *Hylocomium splendens*, *Hypnum jutlandicum* are frequent, as well as hummocks of *Polytrichum commune*, and small amounts of *Sphagnum* species. This vegetation generally occurs on drier peats on both Bwlch Corog (compartment F) and Cefn Coch (compartment J). On the Bwlch Corog section is it generally well characterised and in moderate condition, containing additional *Sphagnum papillosum*, *Sphagnum capillifolium* and *Narthecium ossifragum*. On the flatter areas on the top of Foel Einion, **M17c** occurs in association with *Vaccinium*-rich **M25a** *Molinia-Potentilla* mire and a non-NVC type of bog vegetation **Nodum 19c** *Vaccinium-Sphagnum* vegetation (see below); both these vegetation types are probably derived from **M17**.

The *Drosera rotundifolia* - *Sphagnum* species sub-community **M17a** (Q04 & Q06) is typically found in consistently wetter conditions generally on level ground and is marked by constant *D. rotundifolia* in a carpet of *Sphagnum papillosum* and *Sphagnum capillifolium*; the liverwort *Odontoschisma sphagni* is also frequent. A small basin between two broad ridges on the Bwlch Corog section harbours **M17a** with frequent *Eriophorum angustifolium*, *Erica tetralix*, *T. cespitosum, Eriophorum vaginatum* and *Molinia caerulea*. *Juncus squarrosus*, *Deschampsia flexuosa* and *Vaccinium myrtillus* are all absent in this vegetation. The presence of two horizontal lines through the stand, with a corresponding drop in level, may possibly indicate past peat cutting here. Other stands of **M17a** on Bwlch Corog section are marked by additional *Narthecium ossifragum*. The remaining **M17a** occurs on the saddle of Cefn Coch and is floristically the same as the **M17a** described above. Most of the **M17a** is of good quality though some does have *M. caerulea* at relatively high cover, however, this is never tussock forming nor forms a litter layer.

M21 *Narthecium ossifragum* - *Sphagnum papillosum* valley mire

Very little of this habitat was mapped at Bwlch Corog. All is *Vaccinium oxycoccos* - *Sphagnum recurvum* sub-community, *Narthecium ossifragum* - *Sphagnum papillosum* mire (**M21b**) (Q05) and occurs in discrete hollows within blanket mire and wet heath

vegetation on the Bwlch Corog section of the site (compartment F). It is characterised by constant *Erica tetralix*, *Narthecium ossifragum*, *Eriophorum angustifolium* and *Molinia caerulea* over a *Sphagnum* carpet containing predominantly *Sphagnum papillosum*, but also *S. denticulatum*, *S. cuspidatum*, *S. fallax* and *S. tenellum*. The frequency and cover of *Narthecium* and *E. tetralix* over *S. papillosum* and *S. denticulatum* precludes referral into **M2** *Sphagnum* bog-pool. However, parts of one runnel grade into **M2b** where *Narthecium* and *E. tetralix* reduce in frequency and the *Sphagnum* layer is dominated by mixtures of *S. cuspidatum* and *S. fallax*.

M25 *Molinia caerulea – Potentilla erecta* mire, *Eriophorum vaginatum* variant

The vegetation described in this section comprises *Molinia caerulea*-dominated mire floristically similar to **M25** but with frequent to abundant *Eriophorum vaginatum*. In contrast to the remaining **M25** *Molinia-Potentilla* mire, described in section 3.1.3, this vegetation occurs over deep peat and has probably been derived from **M17** *Scirpus-Eriophorum* blanket mire through burning and overgrazing in the past.

There are two forms on the site which parallel **M25a** and **M25 species-poor** in their species complement. The former has abundant *M. caerulea*, with *Erica tetralix* and *Eriophorum vaginatum*, but with *Trichophorum cespitosum* and other ericoids absent; *Sphagnum* is also usually absent. This vegetation has been mapped as **M25a *Eriophorum vaginatum*** and occurs adjacent to stands of **M17c** *Scirpus-Eriophorum* blanket mire, **M25a**, **M6c** *Carex-Sphagnum* mire and **Nodum 19c** *Vaccinium-Sphagnum* vegetation. Species-poor *M. caerulea*-dominated vegetation harbouring frequent *E. vaginatum* was mapped as **M25 *Eriophorum vaginatum*** in small areas on Cefn Coch, adjacent to **M17a** and **M25 species-poor**. **M25 *Eriophorum vaginatum*** represents a more modified form of blanket bog vegetation compared to **M25a *Eriophorum vaginatum***. This type of vegetation has been recorded in lowland Wales on lowland peatland sites.

M32 *Philonotis fontana - Saxifraga stellaris* spring

This vegetation occurs in a small runnel on the lower north-facing slopes at Pemprys (compartment B). The herbs *Chrysosplenium oppositifolium* and *Montia fontana* occur abundantly, with the grasses *Holcus lanatus*, *Anthoxanthum odoratum* and *Festuca rubra* occasional. It was mapped as the *Montia fontana - Chrysosplenium oppositifolium* sub-community **M32b** despite the absence of *Saxifraga stellaris*. The presence of additional

occasional *Urtica dioica* indicates some level of eutrophication and together with the low species complement implies that the quality of this vegetation is rather low.

Nodum 19 *Vaccinium oxycoccos – Sphagnum recurvum* vegetation

This type of vegetation was mapped in two locations in Pemprys (compartments B and C). It is a vegetation type which has been recognized on peatlands in lowland Wales and is not specifically covered by the NVC. **Nodum 19** is one of a series of noda which were recognized as part of the classification used in the Welsh Lowland Peatland Survey (Ratcliffe 1983). Subsequently, many of these noda were superseded by the NVC, but that covered by **Nodum 19** was not. Subsequent analysis of the original quadrats from the **Nodum 19** dataset, combined with data from the CCW's current Lowland Peatland Survey, have confirmed the distinctness of the nodum and have refined it into three sub-types (Turner 2006). The vegetation normally occurs in a topogenous situation, but one of the three sub-types can also be found as a degraded blanket mire community. It is a species-poor form of mire with frequent to abundant *Eriophorum vaginatum* in which ericoids, *Molinia caerulea*, *Sphagnum recurvum* agg. (normally *S. fallax*), *Vaccinium oxycoccos*, *Polytrichum commune* or *Pleurozium schreberi* can all be prominent, but where species such as *Sphagnum papillosum*, *S. capillifolium*, *Narthecium ossifragum* or *Trichophorum cespitosum* are uncommon or absent. It differs from **M20** *Eriophorum* blanket mire in the high frequency of *Molinia* and/or *Vaccinium oxycoccos*.

The sub-type found at Bwlch Corog is **Nodum 19c**, which is characterized by a similar group of species as **M17c** *Scirpus-Eriophorum* blanket mire: *Vaccinium myrtillus*, *Juncus squarrosus*, *Hypnum jutlandicum* and *Festuca ovina* are usually common. In addition, *Polytrichum commune* and *Pleurozium schreberi* may be frequent to abundant or dominant.

In compartment B on edge of the gently sloping summit plateau of Foel Einion, the **Nodum 19c** vegetation (Q08) has mossy hummocks holding abundant *Vaccinium myrtillus*, *Molinia caerulea* and *Eriophorum vaginatum*, with occasional *Calluna vulgaris* and *Deschampsia flexuosa*. The mossy hummocks are composed of *Pleurozium schreberi* and *Rhytidiadelphus loreus* with *Sphagnum fallax* and *Sphagnum subnitens* occurring in the hollows in between. The adjacent vegetation is mostly **M25a** *Molinia-Potentilla* mire or **M25a *Vaccinium myrtillus*** except to the north where the ground starts to fall away more steeply.

Plate 3.2 Nodum 19c vegetation in compartment C

In compartment C, the **Nodum 19c** is located amidst **M25a *Eriophorum vaginatum*** and **M6c** *Carex-Sphagnum* mire, fairly close to the boundary with coniferous forest. This vegetation (Q07) is closer to **M17c** than that in compartment B. It has abundant *Eriophorum vaginatum*, *Vaccinium oxycoccos* and *Sphagnum fallax* with frequent *Erica tetralix*, *Eriophorum angustifolium*, *Molinia caerulea*, *Deschampsia flexuosa* and *Narthecium ossifragum*. The main ground layer components are *Aulacomnium palustre*, *Pleurozium schreberi*, *Polytrichum strictum*, *Rhytidiadelphus loreus* and *S. fallax*. Other *Sphagnum* species such as *S capillifolium* and *S. papillosum* occur only occasionally.

3.1.3 Grasslands

M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture

M23 is relatively restricted on the site. Both sub-communities are present, but the *Juncus acutiflorus* sub-community **M23a** is the most prevalent. It was seen scattered within mosaics on the southern edge of Bwlch Corog (compartment D), but mainly on the east-facing slopes of Cefn Coch where it abuts the Bwlch Corog upland (compartment G), forming a fringe to the lower more improved slopes. *Juncus acutiflorus* is frequent throughout, with *Juncus effusus* subordinate in cover. Poor-fen herbs *Galium palustre* and *Lotus pedunculatus* are frequent with *Ranunculus flammula* and *Epilobium palustre* occasional. The sward is relatively grassy and holds much *Agrostis canina* and *Holcus lanatus*, the latter indicating a reduction in quality and a move towards more improved vegetation.

M23b, the *Juncus effusus* sub-community, was seen in small stands on the saddle of Cefn Coch (compartment J) and in mosaic on the western east-facing slopes where it abuts onto Bwlch Corog itself (compartments G and H). It also occurs in small amounts within mosaics at Pemprys (compartment C). It has dominant *Juncus effusus*, with frequent *Galium palustre*, *Lotus pedunculatus*, *Athyrium filix-femina*, *Lophocolea bidentata* and, in some stands, *Digitalis purpurea*. *Plagiomnium undulatum*, *Rumex acetosa*, *Molinia caerulea* and *Sphagnum fallax* are all occasional throughout.

M24 *Molinia caerulea – Cirsium dissectum* fen meadow

A small stand of a more base-enriched form of *Molinia caerulea*-dominated vegetation occurs at the top of the south-facing slopes of Pemprys. This was mapped as the *Erica tetralix* sub-community **M24c**. It holds frequent *Erica tetralix*, *Carex pulicaris*, *Potentilla erecta*, *Agrostis canina*, *Juncus effusus*, *Aulacomnium palustre* and *Drosera rotundifolia* with occasional *Sphagnum papillosum*, *Vaccinium myrtillus* and *Danthonia decumbens*. A stand of slightly non-descript **M24** occurs next to a track on the lower eastern slopes of Bwlch Corog almost where it abuts the Cefn Coch section. It is marked as **M24** by frequent, *Carex pulicaris*, whilst the presence of frequent *Holcus lanatus* and *Centaurea nigra* in combination with occasional *E. tetralix* identifies it as the intermediate state between **M24b**, the Typical sub-community, and **M24c**.

M25 *Molinia caerulea – Potentilla erecta* mire

M25 covers vast areas on Bwlch Corog and the gentler slopes of Pemprys and makes up the vast majority of the marshy grassland at Bwlch Corog. Three sub-communities and two forms were recognized.

The most abundant type of this vegetation is represented by the *Anthoxanthum odoratum* sub-community **M25b**. This contains, apart from abundant *Molinia*, frequent *Potentilla erecta* and *Holcus lanatus*, locally frequent *Anthoxanthum odoratum*, and occasional *Trifolium repens* and *Cirsium palustre*. Some stands have additional frequent *Festuca ovina*, *Galium saxatile*, *Agrostis canina* and *Rhytidiadelphus squarrosus*, adding to the overall grassy appearance, while others contain *Vaccinium myrtillus* and *Deschampsia flexuosa* showing affinities to heathier vegetation from which it may have been derived through heavy grazing. The bulk of this is in compartments D and F of Bwlch Corog, where it occurs in mosaic with wet heath and species-poor *M. caerulea*-dominated grassland. It can also be found as small pure stands, on the north-facing slopes of Pemprys and scattered over Cefn Coch (compartment J) within mosaics of **U4a** *Festuca-Agrostis-Galium* grassland, **MG10a** *Holcus-Juncus* rush-pasture, **M23a** *Juncus-Galium* rush-pasture and disturbed vegetation such as **OV24** *Urtica-Galium* and **OV25** *Urtica-Cirsium* communities.

Forming large continuous stands on the fringes of Bwlch Corog and as part of intimate mosaics with wet heath in all three sections of the site is overwhelmingly *Molinia caerulea*-dominated vegetation with very few other associates. This is mapped as **M25 species-poor**. As its name suggests there is overwhelmingly dominant tall tussocky *Molinia caerulea*, containing occasional *Potentilla erecta*, *Juncus acutiflorus* and *Dryopteris dilatata*. This vegetation type is very abundant further east on Pumlumon and particularly on Elenydd (Green *et al.* 1995, Averis and Averis 1999, 2000). Some of this vegetation has been derived from blanket mire by frequent burning and heavy grazing in the past. Some areas of **M25 species-poor** show an affinity with **M15** *Scirpus-Erica* wet heath and are marked by frequent *Vaccinium myrtillus* and *Deschampsia flexuosa* in amongst the dominant *M. caerulea*.

The *Erica tetralix* sub-community **M25a** was recorded in small amounts on Bwlch Corog (compartment F), isolated stands on Cefn Coch (compartment J), and the majority located on the north-facing slopes of Pemprys (compartment B). The **M25a** on the Bwlch Corog

sections contains frequent *Sphagnum papillosum*, *Narthecium ossifragum*, *Carex echinata* and preferentially *Erica tetralix*. A slightly different form, recorded as **M25a *Vaccinium myrtillus*** was mapped on the same north-facing slopes of Pemprys and also in the eastern part of compartment F above the headwaters of the Nant Cefn Coch.

Plate 3.3. M25a *Vaccinium myrtillus* on the northern slopes of Foel Einion.

This vegetation is marked with frequent to abundant *Vaccinium myrtillus*, frequent *Sphagnum capillifolium*, *Deschampsia flexuosa*, *Pleurozium schreberi*, *Rhytidiadelphus loreus*, *Polytrichum commune* and *Potentilla erecta*. It occurs adjacent to **M17c** *Scirpus-Eriophorum* blanket mire, **Nodum 19c** *Vaccinium-Sphagnum* vegetation, **M25 species-poor**, **H18a** *Vaccinium-Deschampsia* heath, **H18a *Sphagnum capillifolium***, **U16c** *Luzula-Vaccinium* community and ***Juncus effusus***, and is probably derived from **M17.**

Vegetation floristically similar to **M25** with frequent to abundant *Eriophorum vaginatum* is dealt with in section 3.1.2 above.

A small area of very wet **M25** at the southern tip of the Bwlch Corog section (compartment D), marked by frequent *Angelica sylvestris*, was referred to the *Angelica sylvestris* sub-community **M25c**. This vegetation has frequent *Lotus pedunculatus*, *Juncus acutiflorus*, *Cirsium palustre*, *Rumex acetosa*, *Epilobium palustre*, *Agrostis canina* and *Galium palustre*. It occurs here in mosaic with **M6c** *Carex-Sphagnum* mire and **M23a** *Juncus-Galium* rush-pasture and is adjacent to tall rank **M25 species-poor** in parts. It is also found very locally in compartment F as a minor component in a mosaic of **M25 species-poor**, **M15d** *Scirpus-Erica* wet heath and **M17c** *Scirpus-Eriophorum* blanket mire.

MG5 *Cynosurus cristatus – Centaurea nigra* grassland

MG5 grassland is represented at the site by a single stand of the *Danthonia decumbens* sub-community **MG5c**. This harbours frequent *Trifolium pratense* and *Lotus corniculatus*, with frequent *Danthonia decumbens*, *Potentilla erecta* and *Succisa pratensis*.

MG6 *Lolium perenne – Cynosurus cristatus* grassland

This was the most frequently observed improved/semi-improved grassland on both the Cefn Coch and Pemprys sections; none, however, was recorded on the dome of Bwlch Corog itself. The improved Typical sub-community, **MG6a,** is confined to both the northern (compartment I) and, to a greater extent, southern fields of Cefn Coch (compartment H), perhaps indicating a longer history of successful land improvement in this latter section. The **MG6** recorded is relatively typical of the community with the grasses *Lolium perenne* and *Cynosurus cristatus* abundant, and *Holcus lanatus* frequent. The herbs *Trifolium repens* and *Cerastium fontanum* are also common. The swards are generally relatively species-poor, but are often punctuated by tall spikes of *Cirsium palustre*, which may indicate sub-surface flushing.

Less widespread is the more species-rich semi-improved *Anthoxanthum odoratum* sub-community **MG6b**. As well as frequent *Anthoxanthum odoratum*, the sward has *Hypochoeris radicata*, *Ranunculus acris*, *Rumex acetosa* and occasional *Luzula campestris*. This vegetation is seen on the western side of the Nant Cefn Coch (compartments G and I) and on the semi-improved areas of Pemprys (compartments C and E).

MG9 *Holcus lanatus – Deschampsia cespitosa* grassland

Unimproved neutral grassland on the site is most commonly seen as **MG9**. All is referable to the *Poa trivialis* sub-community **MG9a** marked by frequent *Agrostis capillaris*, *Anthoxanthum odoratum*, *Potentilla erecta*, *Festuca ovina* and *Rhytidiadelphus squarrosus* overtopped by frequent *Deschampsia cespitosa*. Elsewhere it has frequent to locally common *Holcus lanatus* and occasional to frequent *Juncus effusus*, *Cirsium palustre* and *Luzula sylvatica*.

Plate 3.4 MG9 grassland on the slopes of Bwlch Corog

Superficially it resembles *Deschampsia cespitosa* infested **U4d** *Festuca-Agrostis-Galium* grassland, especially on the north-eastern arm of Pemprys where it forms relatively extensive stands. Elsewhere it forms part of the acid grassland mosaic on Bwlch Corog, but is absent from Cefn Coch.

MG10 *Holcus lanatus – Juncus effuses* rush-pasture

This vegetation community covers the majority of the modified *Juncus*-dominated grassland recorded at Bwlch Corog. Most of the **MG10** is the Typical sub-community **MG10a**. This is characterised by abundant *Juncus effusus* with locally abundant *Holcus lanatus* and *Ranunculus repens*. *Agrostis canina* and *Cirsium palustre* are both frequent

while *Agrostis capillaris*, *Rumex acetosa* and *Anthoxanthum odoratum* are all occasional. It finds its greatest expression in the two unsuccessfully improved areas on the site in compartments C and J. It generally forms mosaics with other forms of improved grassland and other modified vegetation.

Plate 3.5 Small stand of U1 *Festuca ovina – Agrostis capillaries – Rumex acetosella* grassland in compartment J.

U1 *Festuca ovina – Agrostis capillaries – Rumex acetosella* grassland

Small areas of this vegetation were recorded in several compartments (A, F, I and J) where shallow soils encourage summer droughting. The most prominent in Cefn Coch (compartment J) hold mixtures of *Sedum anglicum*, *Rumex acetosella*, *Aira praecox* and *Agrostis capillaris*, with occasional *Lolium perenne*, *Dicranum scoparium*, *Cladonia portentosa*, *C. furcata*, *Deschampsia flexuosa* and *Parmelia saxatilis*. These are characteristic of *Festuca ovina - Agrostis capillaris - Rumex acetosella* grassland (U1) and are generally associated with rock outcropping. *Poa humilis* is additional in one stand on Bwlch Corog. The localised presence of *Galium saxatile* and/or *Potentilla erecta* indicate **U1e,** the *Galium saxatile - Potentilla erecta* sub-community.

U2 *Deschampsia flexuosa* grassland

Scattered through the acid grassland mosaics on the dome of Bwlch Corog are stands of this community marked by dominant *Deschampsia flexuosa* and frequent *Festuca ovina*, *Galium saxatile*, *Rhytidiadelphus squarrosus*, *Scleropodium purum* and *Polytrichum strictum*. *Juncus effusus* and *Polytrichum commune* are both occasional to frequent.

U4 *Festuca ovina – Agrostis capillaries – Galium saxatile* grassland

U4 is the most abundant type of acid grassland on Bwlch Corog. Stands of all five sub-communities are present on the site as well as one variant. The vegetation in general has frequent to abundant grasses such as *Festuca ovina*, *Agrostis capillaris* and *Anthoxanthum odoratum* together with herbs such as *Galium saxatile* and *Potentilla erecta*.

U4e, the *Vaccinium myrtillus* sub-community, accounts for the majority of the **U4** recorded. It has frequent *Vaccinium myrtillus* and *Deschampsia flexuosa*, the former species usually at less than 25% cover, and a carpet of pleurocarpous hynoid mosses. It occurs in large amounts on the central compartments (D and F) of the site in mosaic with other acid (**U5** *Nardus-Galium*, **U6** *Juncus-Festuca*) and marshy grassland (**M25b** *Molinia-Potentilla*), and also as less significant stands on both Pemprys (compartment B) and Cefn Coch (compartment J).

A variant of **U4e** with dominant tussocky *Polytrichum commune* was mapped as **U4e *Polytrichum commune***. This type of vegetation (Q14) has frequent *Agrostis capillaris*, *Anthoxanthum odoratum*, *Festuca ovina*, *Deschampsia flexuosa*, *Galium saxatile*, *Nardus stricta*, *Potentilla erecta*, *Pleurozium schreberi* and *Rhytidiadelphus squarrosus*. *Juncus effusus* and *Sphagnum palustre* are locally frequent. *Vaccinium myrtillus* is also occasional as are the sedges *Carex binervis*, *C. panicea* and *C. pilulifera*. This was seen in three locations: one on the western side of Bwlch Corog abutting the forestry (compartment F) and the second in the south of Cefn Coch (compartment J); both of these locations were on steep banks. The third location is on the southern upper slopes of Cefn Coch abutting the forestry edge (compartment F). The position of this latter stand, very close to the forestry margin, may offer some clue to its origin either through droughting or through needle-fall from the adjacent conifers. Vegetation similar to this has been recorded on Elenydd (Averis and Averis 2000, Averis 2002).

Semi-improved acid grassland was referred to the *Holcus lanatus - Trifolium repens* sub-community **U4b** and contains abundant *Anthoxanthum odoratum* and *Holcus lanatus* with frequent *Agrostis capillaris*, *Festuca rubra*, *Wahlenbergia hederacea*, *Ranunculus repens* and *Scleropodium purum*. *Juncus effusus*, and *Plantago lanceolata* are occasional. This is largely absent from the central compartments, but is found in acid grassland mosaics and as pure stands on Cefn Coch and the Pemprys compartments (A, C and E).

U4a, the Typical sub-community, is widespread across the site, but generally rather localised in its distribution. It has frequent *Festuca ovina*, *Agrostis capillaris*, *Deschampsia flexuosa*, *Potentilla erecta* and *Galium saxatile* and is characterized by the lack of frequent preferentials from the other sub-communities.

The species-rich *Lathyrus montanus - Stachys betonica* sub-community **U4c** has a very limited distribution here, but there are two very small stands on the western slopes of Cefn Coch, marked in both cases by frequent *Lathyrus montanus*, *Stachys betonica* and *Campanula rotundifolia*. The **U4c** is being invaded by *Ulex europaeus* and *Pteridium aquilinum* from nearby stands of **W23** *Ulex-Rubus* scrub and **U20a** *Pteridium-Galium* community.

A few areas of vegetation with frequent *Deschampsia cespitosa* and *Rhytidiadelphus squarrosus* set amongst other **U4** constants were mapped as the *Luzula multiflora - Rhytidiadelphus loreus* sub-community **U4d**. This occurs as small stands on the more steeply sloping areas in compartments B and I. It bears some resemblance to **MG9** and also to **U13** *Deschampsia cespitosa – Galium saxatile* grassland, a generally more upland and northern type of vegetation, but lacks the frequent *Holcus lanatus* and *Agrostis stolonifera* of the former and the more montane species of the latter. Q10 is somewhat transitional between **U4d** and **MG9** but closer to the former.

Plate 3.6 Part of **U4c** stand in Nant Cefn Coch

U5 *Nardus stricta – Galium saxatile* grassland

Pale swards with the dense wiry clumps of *Nardus stricta* as the dominant grass species characterise this vegetation type. It is much less abundant than the closely related **U4** being restricted to acid grassland mosaics on Bwlch Corog (compartments D and F) and one small area on Pemprys (compartment A).

The majority of the **U5** on the site is **U5a**, the Species-poor sub-community. This is dominated by *Nardus stricta* and holds frequent *Festuca ovina*, *Agrostis capillaris*, *Deschampsia flexuosa*, *Potentilla erecta* and *Galium saxatile*.

The *Agrostis canina* - *Polytrichum commune* sub-community **U5b** occurs in one location at the southern end of compartment F in mosaic with **U4e** *Festuca-Agrostis-Galium*

grassland and **U6d** *Juncus-Festuca* grassland. This has additional *Agrostis canina, Luzula multiflora, Juncus squarrosus* and *Polytrichum commune*. It occurs on slightly damper soils than the **U5a**.

U6 *Juncus squarrosus – Festuca ovina* grassland

This type of grassland is characterized by the frequent rosettes of *Juncus squarrosus* set in a matrix of grasses such as *Festuca ovina* and *Nardus stricta* and entwined with trailing shoots of *Potentilla erecta* and *Galium saxatile*, all enmeshed with the mosses *Pleurozium schreberi, Polytrichum commune, Hylocomium splendens* and *Rhytidiadelphus squarrosus*. It is distinguished from **U5** *Nardus-Galium* grassland, to which it can be very similar, by the higher cover of *J. squarrosus* compared with *Nardus stricta*.

U6d, the *Agrostis capillaris - Luzula multiflora* sub-community, has a higher proportion of broad-leaved grasses such as *Agrostis capillaris, Anthoxanthum odoratum* and *Luzula campestris*. This subcommunity was the most frequently encountered and was found in numerous locations, mainly as part of acid grassland mosaics with **U4e** *Festuca-Agrostis-Galium* grassland and **U5a**, but also in pure stands e.g. at the eastern edge of compartment D.

One small stand of **U6c**, the *Vaccinium myrtillus* sub-community, was mapped on the top of Foel Einion (compartment B) in association with **M25a** *Molinia-Potentilla* mire and **M17c** *Scirpus-Eriophorum* blanket mire. This vegetation differs from **U6d** in the high frequency of *Vaccinium myrtillus* and the lower frequency of broad-leaved grasses.

Juncus acutiflorus

This form of damp grassland has abundant *Juncus acutiflorus* in a grassy sward of *Agrostis canina, Holcus lanatus, Agrostis capillaris* and *Trifolium repens*, with no poor fen forbs, which would allow referral to **M23** *Juncus-Galium* rush-pasture. Small patches of this were seen near the pond and high up on the south facing slopes in the valley of the Afon Pemprys (compartment A).

Juncus effusus

Juncus effusus, which was mapped mainly in the same area of Pemprys as the **MG10a** (compartment D), but also occurs in small amounts on the lower eastern slopes and drier areas on the saddle of Bwlch Corog itself. In some locations, this is a very species-poor

vegetation with overwhelmingly dominant *J. effusus*, usually no other associates apart from a few strands of moss, and a well-developed litter layer. Elsewhere, this vegetation can be thought of as very rush-infested **U4** *Festuca-Agrostis-Galium* grassland or **U5** *Nardus-Galium* grassland, with species such as *Festuca ovina*, *Nardus stricta*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Galium saxatile*, *Polytrichum commune* and hypnoid mosses. Vegetation similar to this has been recorded on Pumlumon (Jerram 2005), Elenydd (Averis 2002) and further north in Snowdonia.

Plate 3.7 Compartment C with abundant **MG10** and drier strips with ***Juncus effusus*** vegetation.

The absence of any poor-fen forbs disallows referral to **M23b** *Juncus-Galium* rush-pasture and the absence of mesotrophic grassy associates such as *Holcus lanatus* to **MG10** *Holcus-Juncus* rush-pasture. This type of vegetation is often drier than **MG10**, **M23b** or **M6c** *Carex-Sphagnum* mire.

Other neutral grassland

A single stand of neutral grassland recorded near Cefn Coch farm which has abundant tussocky *Dactylis glomerata*, with frequent *Agrostis capillaris*, *Plantago lanceolata*, *Ranunculus repens*, *Anthoxanthum odoratum*, *Trifolium repens* and occasional *Hypochoeris radicata*. Other species present include *Campanula rotundifolia*, *Achillea ptarmica* and *Lotus pedunculatus*. The absence of species such as *Lotus corniculatus*, *Trifolium pratense*, and *Cynosurus cristatus*, **MG5** markers, disallows placement of this vegetation in that community.

Plate 3.8 *Polytrichum commune* vegetation in compartment F

3.1.4 Fern-dominated vegetation

U19 *Thelypteris limbosperma – Blechnum spicant* community

On steep slopes near the head streams of the Nant Cefn Coch, swathes of dense, lush, yellow-green stands of the fern *Oreopteris limbosperma* and occasional darker green *Blechnum spicant* mark out stands of **U19** (Q12). Below the fern fronds is a thick carpet of pleurocarpous mosses including *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus* with occasional plants of *Festuca ovina*, *Galium saxatile* and *Agrostis capillaris*. This vegetation is associated with **U4e** *Festuca-Agrostis-Galium* grassland and **U20a** *Pteridium*-Galium community above and **M6c** *Carex-Sphagnum* mire below.

Plate 3.9 U19 *Thelypteris limbosperma – Blechnum spicant* community close to the headwaters of the Nant Cefn Coch (compartment F).

U20 *Pteridium aquilinum – Galium saxatile* community

Bracken-dominated vegetation over an acid grassland field layer is extremely common on the site, and was all referred to the *Anthoxanthum odoratum* sub-community **U20a**. This vegetation dominates the mid slopes of both Cefn Coch and Pemprys.

W25 *Pteridium aquilinum - Rubus fruticosus* scrub

Bracken-dominated scrub with frequent *Rubus fruticosus* is confined to the low-level west-facing valley side of the Nant Cefn Coch (compartment I) either in pure stands or associated with mosaics of **W23** *Ulex-Rubus* scrub, **OV25** *Urtica-Cirsium* community and **U4** *Festuca-Agrostis-Galium* grassland.

3.1.5 Rock and scree vegetation

U16 *Luzula sylvatica – Vaccinium myrtillus* tall-herb community

The vegetation referred to this community at Bwlch Corog is slightly mis-named in that there are no tall herbs present in it . It can all be accommodated within the **Species-poor sub-community U16c**, which often doesn't occur on cliff ledges but rather in areas where there has been a relaxation of grazing following heavy grazing, allowing the clones of

Luzula sylvatica to spread. The vegetation has dominant *Luzula sylvatica* with occasional sprigs of *Vaccinium myrtillus*, associated with which are scattered wefts of the pleurocarpous mosses *Rhytidiadelphus loreus*, *R. squarrosus*, *Hypnum jutlandicum*, *Hylocomium splendens*, *Pleurozium schreberi* and *Scleropodium purum*. It forms quite large areas on the north-facing slopes of Pemprys (compartment B) on and beneath broken rock outcrops, and is associated with **H18a** *Vaccinium-Deschampsia* heath, **H18a** ***Sphagnum capillifolium***, **U20a** *Pteridium-Galium* community and **M25a** ***Vaccinium myrtillus*** *Molinia-Potentilla* mire.

Bare rock

Small relatively unvegetated outcrops of bare rock were mapped on the north facing slopes of Foel Einion (compartment B). Elsewhere, the outcrops support **H12a** *Calluna-Vaccinium* heath, **H18a** *Vaccinium-Deschampsia* heath and **U16c** *Luzula-Vaccinium* tall-herb community.

Boulders

A small area of boulders was mapped below the eastern end of the rock outcrops in compartment B.

3.1.6 Woodland

W11 *Quercus petraea – Betula pubescens – Oxalis acetosella* woodland

All the woodland was referred to the ***Dryopteris dilatata*** **sub-community W11a**. It is mostly confined to the Nant Cefn Coch (compartments H and I) with small amounts around the fringe of Cefn Coch (compartment J). The woodland was not examined in any detail.

W22 *Prunus spinosa – Rubus fruticosus* scrub

W22, with dominant *Prunus spinosa*, forms two linear stands along field boundaries at Cefn Coch.

W23 *Ulex europaeus - Rubus fruticosus* scrub

Gorse-dominated scrub is more restricted in its occurrence. **W23** occurs in mosaic with other vegetation immediately to the north of Cefn Coch farm.

Mixed woodland

This category is used for woodland with planted conifers, otherwise similar in composition to the **W11** *Quercus-Betula-Oxalis* woodland elsewhere.

Woodland

The remaining woodland was referred to "Woodland (including mixed woodland)", which was seen at Cefn Coch and resembles **W11** *Quercus–Betula–Oxalis* woodland but has planted conifers throughout.

Dense scrub and **Trees**

Tall trees and peripheral dense scrub were mapped as such.

3.1.7 Swamp and aquatic vegetation

S3 *Carex paniculata swamp*

A very small stand of this vegetation was recorded, associated with tall tussocky **M25 species-poor** *Molinia-Potentilla* mire. Tall tussocks of *Carex paniculata* in species-poor vegetation typify the **S3**, which also holds occasional *Juncus effusus*, *Holcus lanatus*, *Agrostis stolonifera*, *Sphagnum fallax*, *S. palustre* and *Dryopteris carthusiana*. It was recorded in the north-west of Bwlch Corog (compartment F) next to a small stream abutting the forestry.

A24 *Juncus bulbosus* community

Two small artificial ponds dug on the south-facing slopes of Bwlch Corog contain open water full of *Juncus bulbosus*.

Open Water

A single pond was noted in compartment A of Pemprys.

Running Water

The Afon Pemprys is the only running water mapped.

3.1.8 Other habitats

OV24 *Urtica dioica – Galium aparine* community

Immediately south of Cefn Coch farm is a very small area of disturbed species-poor vegetation harbouring frequent tall *Urtica dioica* with sprawling *Galium aparine* throughout indicating **OV24**. The few other associates include *Poa trivialis* and *Taraxacum officinale* agg.

OV25 *Urtica dioica – Cirsium arvense* community

This vegetation contains abundant *Cirsium arvense* and frequent *Ranunculus repens*, *Agrostis capillaris*, *Lolium perenne* with occasional *Juncus effusus* and *Cirsium palustre*. The presence of frequent *Holcus lanatus* in the majority indicates assignment to the ***Holcus lanatus* - *Poa annua* sub-community, OV25a**. This occurs as a large stand adjacent to Cefn Coch farm (compartment I) and over the saddle of Cefn Coch (compartment J) indicating areas of improved ground which have become thistle and nettle infested. On Cefn Coch, the **OV25** occurs in a large complex mosaic with **MG10a** *Holcus-Juncus* rush-pasture, **M23a** *Juncus-Galium* rush-pasture, **M25b** *Molinia-Potentilla* mire and **U20a** *Pteridium-Galium* community.

Bare/disturbed ground

Areas of bare ground were mapped by the Cefn Coch farm buildings.

Building/garden

These are the buildings at Cefn Coch, Llechwedd Einion and Pemprys.

Quarry (disused)

There are two small disused quarries in Pemprys, one on each side of the valley.

Road/track

The tracks around Pemprys and Nant Cefn Coch are all large enough to provide a measurable area and hence were mapped.

Table 3.1 Areas of NVC communities recorded at Bwlch Corog

Vegetation type	Area (ha)	
Heaths		
H4	0.50	0.12%
H8a	0.85	0.20%
H8b	1.08	0.25%
H8e	0.04	0.01%
H8 Species-poor *Ulex gallii*-dominated	0.45	0.11%
H10b	0.01	0.00%
H10b/c	0.03	0.01%
H12a	1.13	0.26%
H18a	0.58	0.14%
H18a *Sphagnum capillifolium*	0.45	0.11%
H18b	0.01	0.00%
M15	0.03	0.01%
M15a	0.01	0.00%
M15b	3.32	0.78%
M15b/d	0.14	0.03%
M15c	0.32	0.07%
M15d	11.40	2.67%
Mire and flush vegetation		
M2b	0.05	0.01%
M6a	0.22	0.05%
M6b	0.15	0.04%
M6c	12.89	3.02%
M6d	1.13	0.26%
M17a	0.93	0.22%
M17c	3.79	0.89%
M21b	0.08	0.02%
M25 *Eriophorum vaginatum*	0.04	0.01%
M25a *Eriophorum vaginatum*	0.15	0.04%
Nodum 19c	2.04	0.48%
Grasslands		
M23a	4.22	0.99%
M23b	0.84	0.20%
M24b/c	0.12	0.03%
M24c	0.05	0.01%
M25a	9.63	2.25%
M25a *Vaccinium myrtillus*	5.56	1.30%
M25b	65.95	15.43%
M25c	1.14	0.27%
M25 species-poor	62.34	14.58%
MG5c	0.06	0.01%
MG6a	18.57	4.34%
MG6b	12.59	2.95%
MG9	5.29	1.24%
MG10a	12.63	2.95%
U1	0.27	0.06%
U1e	0.15	0.04%
U2	0.35	0.08%

U4a	12.61	2.95%
U4b	4.84	1.13%
U4c	0.07	0.02%
U4d	0.34	0.08%
U4e	24.19	5.66%
U4e *Polytrichum commune*	0.79	0.18%
U5a	0.91	0.21%
U5b	0.06	0.01%
U6c	0.02	0.00%
U6d	1.99	0.47%
Juncus acutiflorus	0.32	0.07%
Juncus effusus	18.16	4.25%
Other neutral grassland	0.15	0.04%
Fern-dominated vegetation		
U19	0.32	0.07%
U20a	83.53	19.54%
W25	3.69	0.86%
Rock and scree vegetation		
U16c	1.78	0.42%
Bare rock	0.50	0.12%
Boulders	0.09	0.02%
Woodland		
W11	10.93	2.56%
W22	0.78	0.18%
W23	0.94	0.22%
Dense scrub	1.88	0.44%
Mixed woodland	0.22	0.05%
Tree/s	0.01	0.00%
Woodland	0.10	0.02%
Swamp and aquatic vegetation		
S3	0.16	0.04%
A24	0.13	0.03%
Open Water	0.07	0.02%
Running water	0.63	0.15%
Other habitats		
OV24	0.03	0.01%
OV25	2.50	0.58%
OV25a	8.82	2.06%
Bare/disturbed ground	0.43	0.10%
Building/garden	0.22	0.05%
Quarry (disused)	0.34	0.08%
Road/track	3.32	0.78%
Total area (ha)	427.45	

3.2 Phase 1 habitats

CCW uses the Phase 1 classification as the basis for SSSI feature definition in Wales. The groupings of habitats shown below reflect those used by CCW in defining features on sites. The areas of Phase 1 habitats are given in Table 3.3 at the end of this section.

A.1.1.1 & A.1.2.1 Semi-natural woodland

11.04 ha of woodland habitat were mapped at Bwlch Corog; woodland occurs mainly along Nant Cefn Coch near the access track. The Phase 1 category comprises the **W11** *Quercus-Betula-Oxalis* woodland and indeterminate vegetation mapped just as **Woodland**.

A1.3.2 Conifer

This is represented by a small stand of woodland similar in composition to Semi-natural woodland, but with planted conifers.

A.2.1 Scrub

This vegetation comprises the scrub communities **W22** *Prunus-Pteridium* scrub, **W23** *Ulex-Rubus* scrub and indeterminate scrub mapped as **Dense Scrub**. These occupy 7.3 ha on the site and are mainly concentrated in compartments A and I with minor amounts in compartments G, H and J

B.1 Acid grassland

Acid grassland is relatively extensive, with 46.6 ha mapped. This covers **U1** *Festuca-Agrostis-Rumex* grassland, **U4** *Festuca-Agrostis-Galium* grassland, **U5** *Nardus-Galium* grassland and **U6** *Juncus-Festuca* grassland. It is distributed across most compartments on the site with particular concentrations in D and F.

B.2 Neutral grassland

Neutral grassland is also extensive and occupies 49.3 ha on the site. It includes **MG5** *Cynosurus-Centaurea* pasture, **MG6** *Lolium-Cynosurus* pasture, **MG9** *Holcus-Deschampsia* grassland and **MG10** *Holcus-Juncus* rush-pasture, as well as very small amounts of other non-NVC vegetation. Most of this vegetation can be regarded either as improved or having been derived from improved vegetation. The majority of this vegetation is concentrated in compartments C, E, I and J with very little in A, B, F and H.

B.5 Marshy grassland

Marshy grassland is the most widespread habitat type at Bwlch Corog with 168.3 ha mapped. Two broad types are recorded, those dominated by rushes (**M23** *Juncus-Galium* rush-pasture, ***Juncus acutiflorus*** and ***Juncus effusus***) and those that are *Molinia caerulea*-dominated (**M24** *Molinia-Cirsium* fen-meadow & **M25** *Molinia-Potentilla* mire). This vegetation occurs frequently to abundantly in all compartments apart from A and I in which it is only occasional. The rush-dominated types are more prevalent in areas which have been disturbed in the past perhaps by improvement. Some of the *Molinia*-dominated vegetation shows such a paucity of species and is so tussocky, that historically it must have been burnt and heavily grazed but today it is undergrazed.

C.1.1 Continuous bracken

Areas of continuous bracken constitute the second largest area of habitat on the site at 83.5 ha. This habitat occupies large parts of compartments A and E in Pemprys, and G, H and J in Cefn Coch.

C.3 Other tall-herb and fern

This habitat is represented by a very small patch of **OV24** *Urtica-Galium* community close to Cefn Coch Farm.

D.1 Dry heath

5.1 ha of dry heath was recorded for Bwlch Corog. Five NVC communities contribute to the total area at Bwlch Corog - two dominated by *Ulex gallii* (**H4** *Ulex-Agrostis* heath & **H8** *Calluna-Ulex* heath), and three dominated by mixtures of *Calluna vulgaris* and *Vaccinium myrtillus* (**H10** *Calluna-Erica* heath, **H12** *Calluna-Vaccinium* heath & **H18** *Vaccinium-Deschampsia* heath). The stands of heath are scattered widely across compartments A, B, D, E, F and J; nowhere are the stands extensive.

D.2 Wet heath

Wet heath occupies about three times the area of dry heath and is represented by all the subcommunities of **M15** *Scirpus-Erica* wet heath. The main concentration is in compartment F where it forms mosaics with marshy grassland and blanket bog. Elsewhere there are small stands in most of the other compartments except B and C.

E.1.6 Blanket bog

Blanket bog at Bwlch Corog is represented by **M17** *Scirpus-Eriophorum* blanket mire, **M2** *Sphagnum* bog-pool and an *Eriophorum vaginatum*-rich form of **M25** *Molinia-Potentilla* mire together with **Nodum 19** *Vaccinium-Sphagnum* vegetation, a type of vegetation recognized from Welsh lowland peatlands. Bog habitat occupies 7.0 ha and mainly occurs in the least modified parts of the site (compartments B and F). It frequently occurs in mosaic with wet heath and *Molinia*-dominated marshy grassland. The area shown on Map A3.4.2 is probably an underestimate as some of the species-poor **M25** probably also occurs over deep peat.

E.2 Flush and spring

14.4 ha of Flush vegetation occurs on the site. Apart from a tiny **M32** *Philonotis-Saxifraga* spring, all of this is represented by the four sub-communities of **M6** *Carex-Sphagnum* mire. The majority of this is found in compartments D and F, but small stands are found through most of the remainder of the compartments. In Pemprys compartments A and B it is restricted to the bottom of the valley.

E.3 Fen

Fen is restricted to some very small stands of **M21** *Narthecium*-Sphagnum valley mire in compartment F associated with blanket bog and wet heath.

F.1 Swamp

Swamp is represented by a single stand of **S3** *Carex paniculata* swamp in compartment F

G.1 Open water

Open water is restricted to three small ponds in Pemprys, two in compartment D which have abundant *Juncus bulbosus* and the remaining one in compartment A.

G.2 Running water

Mapped running water is restricted to the Afon Pemprys; the stream along Nant Cefn Coch was not distinguished on the vegetation maps.

I.1 & C.2-3 Natural inland rock exposures, screes & upland ledges

Vegetation referred to this habitat occurs mainly in Pemprys holding, but there is some vegetation at the head of Nant Cefn Coch which is also placed here. Apart from bare rock

and boulders, this habitat is represented by small stands of **U16** *Luzula-Vaccinium* tall-herb community and **U19** *Thelypteris-Blechnum* community.

I.2 Artificial rock exposures

This covers the disused quarries at Pemprys

J.1.2-3 Cultivated/disturbed land

The areas of **OV25** *Urtica-Cirsium* community in compartments I and J around and above Cefn Coch Farm fall into this category.

J.3 Built-up areas

This heading covers all the buildings at Pemprys, Llechwedd Einion and Cefn Coch.

J.4 Bare ground

A small area of bare ground was mapped near Cefn Coch Farm.

Table 3.2 Areas of Phase 1 habitat at Bwlch Corog

Phase 1 code	Phase 1 habitat	Area (ha)	
A.1.1.1 & A.1.2.1	Semi-natural woodland	11.04	2.58%
A.1.3.2	Mixed plantation	0.22	0.05%
A.2.1	Scrub	7.29	1.71%
B.1	Acid grassland	46.59	10.90%
B.2	Neutral grassland	49.29	11.53%
B.5	Marshy grassland	168.33	39.38%
C.1.1	Continuous bracken	83.53	19.54%
C.3	Other tall herb and fern	0.03	0.01%
D.1	Dry heath	5.13	1.20%
D.2	Wet heath	15.22	3.56%
E.1.6	Blanket bog	7.00	1.64%
E.2	Flush and spring	14.39	3.37%
E.3	Fen	0.08	0.02%
F.1	Swamp	0.16	0.04%
G.1	Standing water	0.20	0.05%
G.2	Running water	0.63	0.15%
I.1 & C.2-3	Natural inland rock exposures, screes & upland ledges	2.69	0.63%
I.2	Artificial rock exposures	0.34	0.08%
J.1.2-3	Cultivated/disturbed land	11.32	2.65%
J.3	Built-up areas	3.54	0.83%
J.4	Bare ground	0.43	0.10%
	Total area (ha)	427.45	

3.3 Annex 1 habitats

The habitats in this section are those described in Annex 1 of the EU habitats Directive. The Directive requires EU member states to notify Special Areas of Conservation and the habitat classification used is specified in Annex 1. The inclusion of a section on Annex 1 habitats is for comparative purposes only.

Four Annex 1 habitats are represented on the site occupying more than 1 ha. Of these, the three most important are each briefly described below together with a crude estimate of the amount of the habitat in favourable/unfavourable condition.

4010 Northern Atlantic wet heaths with *Erica tetralix*

This habitat type on the site consists solely of **M15** *Scirpus-Erica* wet heath. A crude estimate of the amount of wet heath habitat in good condition can be made by considering what proportion of the total is **M15b** or **M15b/d**. Under this assumption, c22% is either **M15b** or **M15b/d** which could be considered to be in good condition.

4030 European dry heaths

This habitat type is represented by **H4** *Ulex-Agrostis*, **H8** *Calluna-Ulex*, **H10** *Calluna-Erica*, **H12** *Calluna-Vaccinium* and **H18** *Vaccinium-Deschampsia* heath communities which cover 5.13 ha. The majority of this is **H8** and **H12**. The *Vaccinium*-dominated heath (**H18**) and the species-poor *Ulex gallii*-dominated of **H8** can be considered to be in unfavourable condition. The proportion of these to the total amounts to 29%.

7130 Blanket bogs

Blanket bogs covers the following NVC communities which occur on the site: **M17** ***Scirpus-Eriophorum*** blanket mire, **Nodum 19c** *Vaccinium-Sphagnum* vegetation, and **M25 Eriophorum vaginatum** *Molinia-Potentilla* mire. Of these, all except **M17a** may be considered to be in unfavourable condition, so a crude estimate of the proportion of habitat in favourable condition is c13%.

Other Annex 1 habitats

Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles cover 2.6% of the site area, but insufficient information was collected to provide even a crude estimate of the proportion of the habitat in favourable condition. The remaining Annex 1 habitats

(***Molinia* meadows on calcareous peaty or clayey-silt-laden soils (*Molinion caeruleae*), Natural dystrophic lakes and ponds**) occupy very small areas.

Table 3.3 Areas of Annex 1 habitat at Bwlch Corog

Annex 1 code	**Annex 1 habitat**	**Area (ha)**	
3160	Natural dystrophic lakes and ponds	0.13	0.03%
4010	Northern Atlantic wet heaths with Erica tetralix	15.22	3.56%
4030	European dry heaths	5.13	1.20%
6410	Molinia meadows on calcareous peaty or clayey-silt-laden soils	0.17	0.04%
7130	Blanket bogs	6.91	1.62%
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	10.93	2.56%
-	Not Annex 1 habitat	388.96	91.00%
	Total area (ha)	427.45	

3.4 Uncommon plants

The nationally scarce moss *Sphagnum subsecundum* was recorded from a small patch of neutral flush within a stand of **M6a** *Carex-Sphagnum* mire in the far west of Pemprys at SN 71313 94168.

Barbilophozia atlantica was noted at SN7157093890: this is only the second vice county record for this species. It was growing on steep rocky ground with *Cynodontium bruntonii* and *Phegopteris connectilis*.

No nationally scarce or rare higher plants were recorded. A small colony of *Dryopteris carthusiana* was noted in the stand of **S3** *Carex paniculata* swamp in compartment F. This is a relatively high altitude for this species.

Plate 3.10 *Dryopteris carthusiana*

3.5 Bird species

During the survey, the following species were noted on the site:
Stonechat (*Saxicola torquata*), Kestrel (*Falco tinnunculus*), Yellowhammer (*Emberiza citrinella*), Grasshopper Warbler (*Locustella naevia*), Buzzard (*Buteo buteo*) and Red Kite (*Milvus milvus*).

4. SUMMARY DESCRIPTION OF THE VEGETATION

The site may be broadly split into three sections Pemprys (compartments A-C and E), Cefn Coch (compartments G – J) and the central area of Bwlch Corog (compartments D and F).

The valley section of Pemprys has two contrasting vegetation types: the south-facing slopes are bracken clad (**U20** *Pteridium-Galium*) with occasional stands of acid grassland (**U4** *Festuca-Agrostis-Galium*), wet heath (**M15** *Scirpus-Erica*) and rare marshy grassland (**M24** *Molinia-Cirsium*). The north-facing slopes hold mosaics of marshy grassland (**M25** *Molinia-Potentilla*), acid grassland (**U4** *Festuca-Agrostis-Galium*, **U5** *Nardus-Galium*, **U6** *Juncus-Festuca* and **U16** *Luzula-Vaccinium*), dry heath (**H12** *Calluna-Vaccinium* and **H18** *Vaccinium-Deschampsia*) and small areas of blanket mire (**M17** *Scirpus-Eriophorum* & **Nodum 19** *Vaccinium-Sphagnum*) on the flatter tops. Areas of semi-improved grassland (**MG6** *Lolium-Cynosurus* & **MG9** *Holcus-Deschampsia*) and marshy grassland (**MG10** *Holcus-Juncus*) dominate on the eastern north-facing slopes as well as the northern arm abutting the hill of Bwlch Corog.

The Cefn Coch section has large areas of woodland, scrub and bracken clothing the valley sides, with much improved and semi-improved grassland (**MG6** *Lolium-Cynosurus*) often forming mosaics with vegetation of disturbed habitats (**OV24** *Urtica-Galium* & **OV25** *Urtica-Cirsium*). A small upland area in the south has relatively large areas of acid grassland (**U4** *Festuca-Agrostis-Galium*) and on the high plateau to the north of the farm there is marshy grassland (**M25** *Molinia-Potentilla*) and small areas of blanket mire (**M17** *Scirpus-Eriophorum*) interspersed with more vegetation of disturbed habitats.

The Bwlch Corog section is fundamentally different in its vegetation. The northern half of the hill is predominantly a mosaic of marshy grassland (**M25** *Molinia-Potentilla*) and flush (**M6** *Carex-Sphagnum*) on the slopes, with mosaics containing additional wet heath (**M15** *Scirpus-Erica*) and blanket mire (**M2** *Sphagnum*, **M17** *Scirpus-Eriophorum* & **M21** *Narthecium-Sphagnum*) on the flatter areas. The southern half has much more of an acid grassland mosaic (**U4** *Festuca-Agrostis-Galium*, **U5** *Nardus-Galium* & **U6** *Juncus-Festuca*) with some neutral grassland (**MG9** *Holcus-Deschampsia*) and peripheral marshy grassland (**M23** *Juncus-Galium* & **M25** *Molinia-Potentilla*).